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THE DEVELOPMENT OF A CURRICULUM FOR
A HIGH SCHOOL COURSE IN COMPUTER LITERACY

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education:
Vocational Option

by
Robert Wayne Greenfield

June 1997

THE DEVELOPMENT OF A CURRICULUM FOR
A HIGH SCHOOL COURSE IN COMPUTER LITERACY

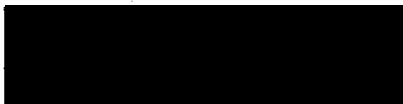
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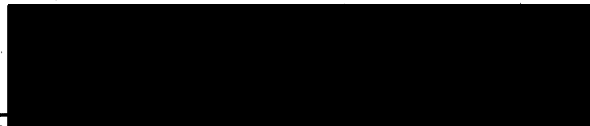
June 1997

Approved by:



Allen D. Truell, Ph.D., First Reader

10/2/96
Date



Ronald K. Pendleton, Ph.D., Second Reader

Abstract

This project was created to develop a much needed computer literacy curriculum for high school teachers. The curriculum was developed specifically for San Andreas High School in the San Bernardino City Unified School District. Many of the high schools in this district are using a very outdated curriculum. A literature review was done to provide the needed elements that are used in the field of computers to be included in this computer literacy curriculum. The design of the curriculum was made so that beginners as well as advanced students would be successful in the course. The course is designed to operate on a limited budget once the necessary hardware and software are in place. In addition, a comparison of old and new curriculums were included to show the changes that were made. Finally, samples of student projects were created so that the students would know what is required of them.

Acknowledgments

To my wife, Lorrie, for her support and understanding. Also to my family for putting up with me. And a special thanks to Dr. Allen Truell for all of the volunteered hours advising me in this project and my courses of study.

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CHAPTER ONE

Background

Introduction

The contents of Chapter One presents an overview of the project. The context of the problem is discussed followed by the problem statement and purpose of the project. Next, the assumptions, delimitations, and limitations that apply to this project are reviewed. Finally, definitions, significance and organization of the project are presented.

The Objective

The objective of this project was to develop a computer literacy curriculum for high school students. The following paragraphs describe the need for such a curriculum.

Context of the Problem

The need for computer literacy has increased due to the reliance individuals have on computers. Computers are found in businesses, homes, and schools. People depend on computers at the grocery store, department store, and nearly all retail stores. Business office personnel at all utility companies rely on computers to keep track of their customers and amount of money that is owed. Many people use the computer at home for word processing, keeping track of personal accounts, and entertainment purposes. Professors at colleges and universities require that papers and reports be word processed. Many professors also require that students use computers for research purposes.

The knowledge of the operation of computers is required for many jobs, and if high school graduates are to be able to obtain jobs, then they must be trained on computer operation (U.S. Department of Labor, 1994). Computer operation is to define the

terminology, being able to use word processing, spreadsheet, and database application programs. People must also be able to correct errors and mistakes that occur during normal operation of a computer. Kilby (1990) noted, "In the workplace, an increasing fraction of jobs will require more computer skills" (p. 306). In order for high school graduates to be able to function in a computer oriented society, high school teachers must prepare the students in the use of computers and computer applications that are used in businesses.

Computer literacy has been an option in the San Bernardino City Unified School District high schools since the late 1970s when computers started to become popular in business. During the late 1970s and the early 1980s, computer literacy consisted mainly of the history of computers and programming in the BASIC language. Many teachers of computer literacy began adjusting their own curriculum as various software programs became available which made greater use of computers for businesses. The curriculum for computer literacy has not been updated in the San Bernardino City Unified School District since 1984. Thus, the written curriculum is considerably different from what is actually being taught in the classroom. In 1985, computer literacy became mandatory for all high school graduates in the San Bernardino City Unified School District. This increased the need for a well defined computer literacy course.

Problem Statement

The problem was that all high school teachers of computer literacy in the San Bernardino City Unified School District were not following a standardized or current course in computer literacy. Teachers of computer literacy were developing their own

courses with no standard outline to follow. Upon checking with the different high schools in the San Bernardino City Unified School District, there were no outlines on file, nor were the teachers using an outline of any type. The reason for not using a standardized outline was that the old outline created in 1984 was outdated and of little use. The students who transferred from one high school to another, during a semester, had difficulty in computer literacy because of the differences in the computer literacy classes. The teachers would not always accept the work created at another high school because of the differences in equipment, software, and required materials.

Purpose of the Project

The purpose of the project was to design a one-semester course that included computer terminology, word processing, spreadsheet, database, desktop publishing, telecommunication, and programming applications. The use of graphics was included to show how enhancements can be made to documents. This course was designed to be an introductory course to enable students to use a computer for various applications. Students can then enroll in more advanced computer classes with greater success than those who had no previous computer experience.

Assumptions

The following assumptions were made regarding this project:

1. Students need computer literacy because of the likelihood they would encounter computers in school, on the job, or at home.
2. Employers will be more likely hire someone who is computer literate than someone who is not computer literate.

Delimitations

The computer literacy course was designed for instruction on IBM or compatible personal computers. The computers need to have the Intel 386 processor or higher to function adequately. However, the course can easily be adapted for the Apple Macintosh computers which support all the various application software or equivalent.

Limitations

The computer literacy course was limited to the available equipment, software, and other resources.

Definitions

For the purpose of this project the following terms were defined:

Computer	A machine that uses software.
Database	A computer program that manages the collection, storage, access, and organization of data.
Desktop Publishing	A computer program that enable a person to create newsletters, booklets, brochures, flyers, business cards, and invitations.
Graphics	Art, drawings, or photos.
Hardware	The physical components of the computer system.
Spreadsheet	A computer program that lets the user enter, calculate and manipulate numerical data.
Software	The programs that enable the users to use the computer for a multitude of productivity and other purposes.

Telecommunications The transmission of data -- voice, video, speech over communications media such as telephone lines or wireless channels.

Word Processor Computer programs that lets the user create documents such as letters, business reports, memos, and newsletters.

Significance of the Project

The current computer literacy curriculum is not sufficient to educate the students to be prepared in the job market after high school. This curriculum was developed to provide the students with the skills necessary to communicate with others concerning computer use which will increase their chances of obtaining a job.

Organization of the Project

The remainder of the project includes a literature review. Next, the methodology used to complete the project is described. Conclusions, the curriculum for the proposed course, and references follows the methodology. The curriculum consists of a course description, course outline, evaluations, information handouts and examples of course projects.

CHAPTER TWO

Review of the Literature

Introduction

The purpose of this literature review is two fold: (1) to gather information from experts and other researchers, who are computer users, in regards to the validity and necessity of computer literacy as a curriculum in the public schools and (2) what types of computer applications should be taught in relation to workplace demands. There are several areas of applications in which to consider for business and home use. Word processing, spreadsheet, and database are the more common applications. Terminology and software involving graphics, design, and programming are also presented.

Literature Review

Lewis (1995) stated that more than two million jobs are eliminated annually from corporations in the United States. Further, the U.S. manufacturing workforce was down to 17% in the early 1990s, from 33% in 1950. However, productivity increased by 35% from 1979 to 1992 as a result of computerization. The jobs are not being eliminated, rather, new jobs in high tech are replacing those old jobs in manufacturing. Lewis (1995) noted, that "Al Shugart, chairman of Seagate Technology, advises young people to learn to read and write, and gain computer literacy skills" (p. 11).

Cassel (1995) posed an interesting question, "what is it that an accountant, a novelist, a restaurateur, a business executive, an electronics engineer, a sales person, and an investment counselor have in common? They all use a computer to supply, store, and process information in order to do their job or run the company more effectively" (p. 4).

Cassel (1995) indicated that the operation of a computer encompasses many types of employment and as people pay attention to the things that go on around them, they find the use of computers in other areas as well. Personnel from hospitals, law offices, warehouses, schools, and even fast food restaurants rely on computers to keep track of daily business operations, income, expenses, and inventory. So, the operation of a computer is intertwined in the working world. Cassel (1995) stated that even though the computer is important to many jobs, knowledgeable people are needed for the successful operation of businesses. Computers cannot replace those workers with the expertise needed to perform the jobs. Without those people who could use the computer effectively, "the computer might as well be used as a boat anchor" (Cassel, 1995, p. 5).

As computers were advertised heavily, people who did not understand computers wanted to understand them so that they would not feel they were being left out of modern technology. People wondered which problems computers could solve and which problems computers could not solve. Since computers were playing an important role in the lives of people, a deeper understanding of computers becomes almost a necessity (Biermann, 1994). Although many experts did consider programming an important function in the use of computers, Biermann (1994) stated that becoming proficient at programming demonstrates that computers are not so intelligent and that programming teaches that the function of the computer can be controlled, even by novices. Knowing how a computer can be programmed takes the magic out of the computer and reveals the efforts in creating computer programs by programmers, thus, giving an appreciation on how computers operate. Biermann (1994) asked, "if a machine has a virus, should you be careful not to

catch it yourself?” (p. 65). Those people who understand computers can easily answer this question. However, those people who do not understand computer hardware and software will be left in the dark because computers exist in many stores and businesses and they will not know how they work. The understanding of computer equipment, software, and terminology is very important to anyone who operates a computer.

Dvorak (1991) explains the purpose of computer terminology and why there is no such thing as plain English in computers. Dvorak (1991) used an analogy of automobiles and cooking. In automobiles, there are terms such as *engine*, *spark plug*, *alternator*, *generator*, *gas pedal*, *clutch*, *brake*, *carburetor*, and *fuel injector*. In cooking, there are terms like *ravioli*, *sweetbreads*, *paella*, *chow yoke*, and *minestrone*. Many people are not experts in automobiles and cooking, but they have used many of these terms which enable us to communicate with experts in the field. The more terminology people understand, the easier it is for them to communicate with others. Computers are no different in that they too have their own unique terminology. Dvorak (1991) stated, terminology has a purpose and if someone had to give long detailed descriptions every time they had to speak of a subject, it would be ridiculous. Therefore, computer terminology must be included in any subject related to computers in order for proper communication to be possible.

Half (1995) conducted a survey of 150 executives of the largest 1,000 companies in the United States. A question posed by Half (1995) was, “do you think that technological advancements in the workplace have quickened the pace of business to an excessive level?” (p. 12). Seventy-five percent of the executives responded no to the question. Half (1995) stated that “employers want people who are proficient in the use of

today's technology, who are comfortable with it and its application" (p. 12). As advised by Half (1995), others should take computer courses which are offered in the local community and to spend time with hands-on training. Those who are not computer oriented, or have not had any training, could be left in the dust if a company they are working for updates to computer technology. Half (1995) also mentioned that being a computer expert is not necessary, but for those who wish to advance in their career need to become close friends with a computer.

According to the statisticians at the U.S. Department of Labor, Bureau of Labor Statistics (1994), typists, word processors, data entry keyers, which are found in many offices, must possess computer and word processing skills. Since many of the jobs only require that the applicants be high school graduates, these skills must be taught in high school. High school graduates, who become secretaries or office clerks, require knowledge of word processing, spreadsheet, and database management programs for most employers.

According to Dyrli (1995), students are more familiar with athletes and entertainers than with politicians and world leaders. The Internet and the World Wide Web allow students easy access to government officials, documents, speeches, bills, and voting records. Not only are communications possible, the Internet has other resources including news articles, books, maps, photographs, and software (Dyrli & Kinnaman, 1995). All of the resources are available anytime, 24 hours a day, which makes finding information or doing research convenient.

Teachers, and the public, should consider the comment by Pournelle (1990), “I think if you can’t use a computer 50 years from now, you will be in almost exactly the same position as a person who cannot read or write now. The difference is that I think using the computer will be easier 50 years from now than it is to learn to read and write” (p. 303).

Summary

The results revealed by the literature show that computer skills are very important for seeking employment and for those who wish to advance in their career. An assortment of computer skills should be taught at the high-school level in order for high-school graduates to develop employability skills. Not only word processing, spreadsheet, and database software need to be included, but also computer terminology, desktop publishing, telecommunications, and computer programming as well. However, teachers should not limit themselves in what they teach, as the computer field is constantly expanding and there are many other computer applications currently in use. Teachers should be prepared to expand their existing curriculum before any new curriculum is finalized. The Internet can also be used, both as a teaching tool, as well as a resource tool for anyone to use.

CHAPTER THREE

Methodology

Introduction

This section describes how the project was developed. First, the course materials that were developed included a course description, course outline, and examples of course projects. Second, the student population this course was developed for will be described. Third, the estimated cost of this course is included. Finally, existing programs are provided.

Curriculum Design

The contents of the curriculum was developed by the computer literacy task force committee formed in January 1996 by the Assistant Superintendent, Dr. Joanne Tortarolo, in the San Bernardino City Unified School District and by an analysis of the literature reviewed. Since this course has no prerequisites, instructions on how to turn on the computer, diskette handling, keyboard use, mouse use, operating system, and entering and exiting of application programs will be the first topics. Also included is computer terminology which will be discussed throughout the course.

The three major applications of word processing, database, and spreadsheet are presented as the most important applications in business. Graphics and scanned photographs will be included to enhance documents. Telecommunications will be introduced, and for schools that are connected to the Internet, then a project using information found on the Internet will be created. Desktop publishing will be presented and students are required to create a project that will require creativity on the part of

students. A short lesson in programming is included. Samples of all projects, which were created by the writer of this project, will be available as handouts. The course outline will include all topics of instruction.

For the purpose of this project, an outline used by the San Bernardino City Unified School District was followed. The outline consists of the following parts: 1) course title, 2) grade level, 3) course length, 4) prerequisites, 5) course type, 6) course description, 7) basic texts, 8) supplementary materials, 9) student objectives, 10) course outline, 11) instructional methods, 12) times of instruction, and 13) evaluation.

Population

This course was developed for any student, 9th grade through 12th grade, at San Andreas High School in the San Bernardino City Unified School District. The course may be used at any high school in the San Bernardino City Unified School District, since it was developed in accordance with the San Bernardino City Unified School District computer literacy guidelines. These guideline were developed by a committee, on which the author of this project served, headed by Dr. Joanne Tortarolo, Assistant Superintendent of the San Bernardino City Unified School District.

Budget

The estimated cost of this course is approximately \$200 to \$300 per year for diskettes, paper, and printer ribbons or ink cartridges. The cost should be sufficient to serve approximately 300 to 400 students per year. The major expenses will be to update equipment and to purchase software. The cost of equipment upgrades and software varies

according to market conditions and needs of the instructor to adequately teach the course to the needs of the students and the community.

Current program

The current computer literacy program in the San Bernardino City Unified School District consists of the historical development of computers, languages, terminology, ethics, applications, and programming. The computer lab focuses on programming in BASIC. However, some time was spent on word processing, spreadsheet, and database.

Current course outline

COMPUTER LITERACY COURSE OUTLINE

(San Bernardino City Unified School District)

12-3-1984

NAME OF COURSE: Computer Literacy

DEPARTMENT: Miscellaneous

GRADE LEVEL: 9, 10, 11, or 12

LENGTH IN SEMESTERS: One

PREREQUISITES: None

TYPE OF COURSE: Graduation Requirement

COURSE DESCRIPTION: This course is designed to develop the very basic skills necessary to interact with computers. The curriculum is to be one-half classroom instruction and one-half "hands-on" laboratory experience. Forty percent of the time spent in the laboratory is devoted to applications software with sixty percent of the time spent on keyboard, graphics and simple programming skills. Students will learn about the historical development as well as the future development of computers, general ethics in the use of computers, the impact of computers on society and various uses of the computer. (Students may challenge this basic course for credit beginning Fall, 1985.)

BASIC TEXTS: (under consideration)

SUPPLEMENTARY TEXTS: (under consideration)

SUPPLEMENTARY TEACHING MATERIALS: (under consideration)

PERFORMANCE/LEARNING OBJECTIVES:

Awareness component

1. The learner will identify major areas associated with computer design.
2. The learner will identify concepts and inventions which led to modern day computer developments and the developer or inventor associated with them.
3. The learner will identify major factors that have contributed to the growth and utilization of the computer.
4. The learner will identify how the computer can simplify complex operations.
5. The learner will identify specific ways in which the computer can free the user to focus on the problem-solving process.
6. The learner will recognize and use ethical principles and will accept legal and personal responsibilities for the use of computers.
7. The learner will identify and explain the major computer components and terminology.
8. The learner will identify computer types and operational modes.
9. The learner will identify names and purposes for different computer languages.
10. The learner will identify hardware components.
11. The learner will identify some of the ways that career opportunities are positively and negatively influenced by the use of computers now and in the future.
12. The learner will realize how home and business adoption of the computer as a tool may cause greater dependence and/or independence on the computer's use.
13. The learner will give examples of how the individual and society will be affected by the computer.

14. The learner will be able to use simple programs that have personal and professional application.
15. The learner will identify specific ways computers are being utilized in business and scientific application.
16. The learner will be able to list several ways in which computers can assist the consumer.
17. The learner will identify methods of how the computer can assist in education.
18. The learner will identify how the computer is being utilized in other areas.
19. The learner will identify and explore possible new practical applications.
20. The learner will list several futuristic applications describing how computers may influence society.

Theory and Simple Applications Component

1. The learner will identify hardware components.
2. The learner will define specific computer terms.
3. The learner will identify the purpose and use of peripherals.
4. The learner will identify the names and purpose for different computer languages.
5. The learner will be able to interact with a computer.
6. The learner will identify important environmental conditions hazardous to a computer.
7. The learner will understand that a computer can perform arithmetic operations in a specified order.
8. The learner will recognize that there are key words in BASIC.
9. The learner will identify the correct output for a simple program segment.
10. The learner will locate and identify computer-recognizable errors in a program.
11. The learner will modify a given program to perform a new task or function.
12. The learner will identify the steps in a simple problem-solving model.

CONTENT

- I. Awareness Component
 - A. Historical Development
 1. computer design areas
 - a. mechanical
 - b. vacuum tube
 - c. transistor
 - d. integrated circuitry
 2. concepts and inventions
 - a. Abacus--Chinese

- b. Logarithm--Napier
 - c. Digital Counter--Pascal
 - d. Analytical Engine--Babbage
 - e. Codes--Hollerith
 - 3. growth and utilization factors
 - a. speed
 - b. accuracy
 - c. cost
- B. Problem-Solving
 - 1. simplification of complex operations
 - a. sorting and organizing
 - b. word processing
 - c. repetitive calculations
 - 2. focusing on the problem-solving process
 - a. focus on the problem not mechanical and repetitious details
 - b. speed and accuracy of analysis
- C. Ethics
 - 1. Ethical principles
 - a. honesty
 - b. respect for copyright
 - c. research
 - 2. hardware components
 - a. card readers
 - b. key punch
 - c. storage devices
 - d. networking systems
 - 3. computer types and operational modes
 - a. mainframe
 - b. mini
 - c. micro
 - d. digital
 - e. analog
 - 4. the learner will identify names and purposes for different computer languages
 - a. BASIC
 - b. PASCAL
 - c. COBOL
 - d. FORTRAN
 - e. LOGO
- D. Computer Structure and terminology
 - 1. major computer components
 - a. input
 - b. output

- c. processing
 - 1. memory and storage
 - 2. control
 - 3. arithmetic logic unit,
bit, byte, RAM, ROM,
hardware, software, interface
- E. Impact on Society
 - 1. influence of computers on careers
 - a. change in methods of manufacturing
 - b. change in business procedures
 - c. change in job skills
 - d. unemployment
 - 2. computer as a cause of independence or dependence
 - a. problem solving task versus mechanical task components
 - b. understanding a concept versus lack of understanding and rote usage
 - 3. influence on individual and society
 - a. bank accounts
 - b. utility bills
 - c. traffic lights
 - d. taxes
 - e. mail
- F. Major Uses and Applications
 - 1. The learner will be able to use simple programs that have general personal and professional applications
 - a. word processing
 - b. data base management
 - c. spread sheets
 - 2. business and scientific applications
 - a. word processing
 - b. accounting
 - c. data storage and retrieval
 - d. laboratory analysis
 - e. electronic mail
 - f. electronic transfer of funds
 - 3. computers assisting the consumer
 - a. lower costs by reducing overhead
 - b. lower costs by increasing speed and accuracy
 - c. inventory control
 - 4. computers in education
 - a. simulations
 - b. CAI

- c. tutorials
 - d. games
 - e. drill and practice
 - f. problem solving
- 5. other applications
 - a. medicine
 - b. military defense
 - c. telecommunications
 - d. career applications
 - e. home and personal use
 - f. weather
 - g. government
- 6. new practical applications
 - a. robotics
 - b. voice synthesizers
 - c. artificial intelligence
 - d. video disks
- 7. influence of futuristic applications
 - a. robotics
 - b. electronic banking
 - c. communications networks
 - d. automobiles
 - e. space technology
- G. How Computers Process Data
 - 1. data is manipulated, processed and handled electronically
 - a. analog
 - b. digital
 - c. 1=on
 - d. 0=off
 - 2. purpose of binary code in computer communication
 - a. ASCII
 - b. EBCDIC
 - c. base 10 to base 2 and base 16
 - 3. equipment vs. methods to store data
 - a. disk drive
 - b. cards
 - c. tape drive
 - d. diskettes
 - e. recorder
 - f. printer

II. Theory and Simple Applications

A. Computer Vocabulary

- 1. hardware components

- a. disk drive
 - b. cassette tape recorder
 - c. keyboard
 - d. CRT
 - e. CPU
 - f. card readers
 - g. key punch machines
- 2. computer terms
 - a. bit
 - b. byte
 - c. RAM
 - d. ROM
 - e. hardware
 - f. software
 - g. interface
- 3. peripherals (use and purpose)
 - a. disk drive
 - b. printer
- 4. computer languages
 - a. BASIC
 - b. PASCAL
 - c. COBOL
 - d. FORTRAN
 - e. LOGO
- B. Handling, Use and Care of Equipment
 - 1. operating and communicating with a computer
 - a. turn on
 - b. load
 - c. clear
 - d. store
 - e. save
 - f. print
 - g. type commands in using keyboard
 - h. use course ware to aid in solution of a problem
 - 2. impact of environment conditions
 - a. fluids
 - b. dust
 - c. smoke
 - d. static electricity
 - e. storage and care of hardware
 - f. climatic conditions including temperature
- D. Programming and Problem Solving Procedures
 - 1. order of arithmetic operations

2. BASIC key words
 - a. PRINT, LET, REM, END, INPUT, IF...THEN, GOTO, GOSUB, RETURN, FOR...NEXT
3. different program outputs
 - a. 10 PRINT "3 * 2"
 - b. 20 PRINT 3 * 2
4. computer-recognizable errors
5. problem solving model
 1. documentation (prior to entering into computer)
 - a. written plan
 - b. diagram
 - c. properly coded BASIC program
 2. execution
 - a. enter program into the computer
 - b. RUN and debug the program
 - c. check for accurate computer output

I. Awareness

A. Historical

1. people
2. hardware
3. development/Evolution Factors

B. Ethics

1. legal
2. personal
3. professional ethics
 - a. copyright violations
 - b. piracy
 - c. right of access
 - d. plagiarism

C. Applications

1. word processing
 - a. files
 - b. accounting
2. computer assisted instruction (CAI)
3. personal
4. industrial
5. space
6. military
7. robotics
8. CAD/CAM

D. Impact on Society

1. past/present/future
2. career

- a. employment
 - b. social
 - c. education
 - d. telecommunication
 - e. exploration
 - f. space
 - g. geology
 - 3. future uses
 - a. robotics
 - b. communications
 - c. networks
- II. A. Start up
 - 1. components
 - a. input-processing unit-output
 - b. system (CPU/Peripherals/Storage)
 - 2. software
 - 3. operational procedures
 - a. booting the system
 - b. components
 - c. using keyboard
 - d. initialize and copy disk
 - e. safety and rules
 - f. care of equipment
 - g. software
- B. Basic Statements and Commands (to include but not limited to)
 - 1. PRINT, LET, REM, GOTO, RUN, IF/THEN, LIST, NEW, GET, CATALOG, HOME, INPUT, FOR/NEXT, READ/DATA
 - 2. format
 - a. TAB
 - b. :
 - c. ;
 - d. ,
 - e. “
 - 3. control keys (special)
 - a. control C
 - b. edit
 - c. control S
 - d. escape
 - e. delete
 - f. open and closed apple
- C. Additional Topics
 - 1. low res/high res graphics
 - 2. LOGO

- 3. telecommunications/modems
- D. Problem Solving
 - 1. identification of problem
 - 2. application of computer to solve problem
 - 3. adjust solution
 - 4. use of available software to real life problems (such as word processing, etc.)
- E. Projects
 - 1. student/teacher determined

Existing program

San Bernardino Valley College offers a course in computer literacy. The lab centers on word processing, spreadsheet, and database. The course includes computer terminology, hardware, software, history, uses, and the impact of computers on society. A discussion of computer ethics and computer crime is included. Computer history and the evolutionary development of computers are no longer deemed relevant in the San Bernardino City Unified School District. The computer literacy task force decided the time would be better spent with more hands-on computer usage. San Bernardino Valley College is the local community college. Since many high school graduates from the San Bernardino City Unified School District attend this college, a comparison of computer literacy courses was done to show compatibility.

Existing course outline

**SBVC
Science Division
Computer Systems Department**

1. Course Identification and Title

- a) CSYS101; Computer Literacy
- b) Class hours: 2 hours lecture, 2 hours computer lab; 3 units

- c) Course description: This is a comprehensive introductory digital computer survey course for students with little or no computer background. The course outlines the skills necessary to achieve computer literacy and teaches the key concepts, systems and applications that are essential to making the computer a useful and productive tool.

2. Entrance Skills

There are no formal prerequisites for this course; however, the ability to read, write, and comprehend on a first year college level is recommended for maximum success.

3. Required Course Materials

An acceptable text for this course and the one that is currently being used is:

Introducing Computers, Concepts, Systems and Applications -- 1992-93

Robert H. Blissmer
John Wiley and Sons, Inc.

This text is primarily college level.

An additional text required for the computer laboratory is:

Discovering Microsoft Works -- 1989

Sachs/Kronstadt
John Wiley and Sons, Inc.

This text is primarily college level.

Supplementary material such as computer disks are required to be purchased by the student.

Computer software will either be included as part of the computer laboratory workbook which the student purchases or will be available for use on the SBVC computers. Software available as "freeware" or "shareware" may also be furnished by the Instructor.

5. Course Objectives

Upon satisfactory completion of this course the student will have the ability to read and critically evaluate newspaper articles and advertisements dealing with personal computers.

The student will be conversant with the evolutionary development of computers and be able to identify prominent historic individuals and their contributions.

The student will have practical experience in personal computer applications and the use of software for word-processing, spreadsheet and database and will be familiar with the terminology and jargon used in those areas.

The student will be exposed to the present day computerization of society and the changing nature of the workplace including the information society and the economics of information.

The student will be able to identify and evaluate the selection of suitable computer hardware used in the major subsystems of a computer such as input, output, processors, memories and mass storage subsystems.

5. Course Content

Lecture topics include computer terminology, computer history and development, computer uses, the impact of computers on society, the changing workplace, computer crime, and current events reported in the press that may occur during the duration of the course.

In the computer laboratory the student will obtain experience in word-processing, spreadsheet, and database design and usage.

6. Methods of Instruction

Methods of instruction will vary as required for the particular subject matter being presented but will include lectures, directed discussions, research papers, small-group projects, audiovisual aids and video films.

7. Methods of evaluation

Students will be evaluated using a combination of true-false tests, multiple choice tests, sentence completion tests, essay tests, term projects and assignments and the instructor's overall assessment of the student's ability. Grading may be comparative within a class or may be based on an absolute standard.

Summary

This course was designed to teach major applications performed by the computer as well as initial introductions to the computer for beginners. The population this course is directed at is any high school 9th through 12th grades in the San Bernardino City Unified School District. Although initial cost of equipment and software could be expensive, the cost of running a computer literacy class should be low. This course would supersede the current program which is not sufficient in training students in current employability skills. In addition, this course parallels the class at San Bernardino Valley College to some extent, with exception that history is not emphasized in the high school curriculum and that graphics, or desktop publishing, will be extensively used.

CHAPTER FOUR

Conclusions and Recommendations

Introduction

As a result of reviewing the literature and examining existing computer literacy curriculums, a number of conclusions and recommendations were formed. These conclusions and recommendations are presented next.

Conclusions

In developing this project, the following conclusions were made:

- The current curriculum is no longer valid.
- There is no consistency with what is being taught at the various high schools in the San Bernardino City Unified School District.
- Many students who graduate from high school are not prepared in computer skills sufficiently for the workplace.
- Computers exist in many places of employment and computer literate employees are needed.

Recommendations

The following recommendations are made to fully implement current computer technology:

- The curriculum be reviewed annually and updated as needed.
- A fund be set aside to accumulate the necessary funds so that hardware can be updated or replaced every three years.

- Computer software to be updated as new versions are released and available software examined to see if it is a popular program in the workplace.
- An advisory committee formed for business input.

Summary

Conclusions and recommendations were formed as a result of reviewing the related literature and examining existing curriculums. These conclusions and recommendations were presented in this chapter.

APPENDIX A

Course Outline

Computer Literacy Course

Course Title: Computer Literacy

Grade Level: 9, 10, 11, 12

Course length: One semester

Prerequisites: None, however typing experience recommended

Course type: Graduation requirement

Course Description:

This course is designed to develop the basic skills necessary to interact with computers. Included are computer components, terminology, computer operation, word processing, database management, spreadsheet, graphics, desktop publishing, multimedia applications, telecommunications, ethics, and the impact of computers on society. A short introduction to BASIC programming is included.

Basic texts:

Welcome to the World of Computers, Labyrinth publications.
Printshop deluxe user manuals

Supplementary materials:

Microsoft Works software
Printshop deluxe software
Netscape software (or similar)
Multimedia application software (encyclopedia, etc.)
BASIC interpreter software
Teacher designed materials
Audio-visual aides

Student Objectives

After successful completion of this course, student will be able to:

1. Identify the major components of a computer

2. Define various computer terms
3. Startup and shutdown a computer properly
4. Operate the alpha-numeric keyboard
5. Create, edit, and print documents in a word processor
6. Create, edit, and print a database file
7. Merge a database file into a word processor document
8. Create, edit, and print a spreadsheet
9. Create and print a document using graphics in desktop publishing
10. Use multimedia software to research specific topics
11. Use telecommunications and connect to the Internet to gather specific information
12. Describe and input a simple BASIC program
13. Describe computer crime
14. Describe the affect of computers on society

Course Outline:

I. Classroom Management

- A. Procedures
- B. Attendance
- C. Course requirements
- D. Grading policy

II. Introduction to Equipment

- A. Architecture
- B. Hardware, turn on and off
- C. Software, loading and exiting
- D. Keyboard, alpha-numeric
- D. Care of equipment, materials and workstations
- E. Safety

III. Terminology

(see attached)

IV. Operating systems

- A. MS-DOS
- B. Windows
- C. GUI

V. Word Processing

- A. Creating a document
- B. Formatting
- C. Editing
- D. Spell check
- E. Fonts
- F. Bold, italic, underline
- G. Saving and retrieving
- H. Printing
- I. Graphics

VI. Database

- A. Creating a new database
- B. Fields and records
- C. Entering and editing data
- D. Searching and matching data
- E. Sorting
- F. Saving and retrieving
- G. Printing

VII. Merging database and word processor

- A. Create database
- B. Create merge document in word processor
- C. Perform a print merge operation

VIII. Spreadsheets

- A. Creating a new spreadsheet
- B. Cells, columns, and rows
- C. Entering and editing data
- D. Creating formulas
- E. 'What if' calculations
- F. Creating graphs and charts
- G. Saving and retrieving
- H. Printing

IX. Desktop publishing

- A. Creating a new document

- B. Signs, posters, cards, stationary, banners, and certificates
 - C. Layout, background
 - D. Headline, text, fonts, customize
 - E. Graphics, inserting, moving, sizing
 - F. Landscape, portrait
 - G. Color, black and white
 - H. Printing
- X. Multimedia
- A. Video and sound
 - B. Photos
 - C. Searching and research
 - D. Printing
- XI. Telecommunications
- A. Hardware and software requirements
 - B. Services
 - C. Internet
 - D. World Wide Web
 - E. Searching
 - F. Downloading and uploading
 - G. E-mail
- XII. Programing
- A. BASIC language
 - B. Entering a simple program
 - C. Executing program
 - D. Description of program operation
- XIII. Computer Ethics
- A. Computer crime
 - B. Copyright infringements
 - C. Piracy
 - D. Plagiarism
 - E. Shareware, freeware, and commercial software
 - F. Moral use of computers

XIV. Computers Impact on Society

- A. Privacy issues**
- B. Careers**
- C. Communications**
- D. Education**
- E. Future uses**

Instructional Methods:

Textbook, Lecture, Handouts, Demonstrations, Hands-on experience

Times of Instruction:

**1 hour per day, five days a week for one semester
(or 2 hours per day for five or six week blocks)**

Evaluation:

**Student participation and progress
Teacher observations
Quizzes, test
Completion of assignments
Completion of a project**

COMPUTER TERMS

1. ALU
2. ANSI
3. ASCII
4. BIOS
5. Bit
6. bps
7. Byte
9. Cache
9. CAD
10. CD-ROM
11. CMOS
12. CPS
13. CPU
14. DIP
15. DMP
16. DS,DD
17. DS,HD
18. dpi
19. DRAM
20. EDO-RAM

21. **EEPROM**
22. **E-mail**
23. **EMR**
24. **FORMAT**
25. **FPU**
26. **GB**
27. **GIGO**
28. **GUI**
29. **Icon**
30. **I/O**
31. **IBM**
32. **IC**
33. **IDE**
34. **K**
35. **LAN**
36. **LCD**
37. **LED**
38. **MB**
39. **MHZ**
40. **MICR**
41. **MODEM**
42. **Mouse**

- 43. MPEG
- 44. MS-DOS
- 45. NiMH
- 46. OCR
- 47. OLE
- 48. PC
- 49. PROM
- 50. QBASIC
- 51. RAM
- 52. ROM
- 53. SCSI
- 54. SIMM
- 55. SRAM
- 56. SVGA
- 57. Sysop
- 58. UPC
- 59. UPS
- 60. VIRUS
- 61. VLSI
- 62. VRAM
- 63. WORM
- 64. WWW

Computer Literacy Requirements

- I. Each student will keep a notebook with projects that demonstrates ability for each section of computer literacy.
- II. A list of computer terms will be provided for each student to complete. The definition of each term must be written in the students own handwriting.
- III. Students will do a variety of word processing, database management, and spreadsheet exercises from the textbook.
- IV. Each student will do desktop publishing exercises as handed out from instructor.
- V. Students will do a research project using multimedia and produce a word processed report based upon the research. Topic and length will be given by the instructor.
- VI. When available, students will do a research project using telecommunications, accessing the Internet and World Wide Web.
- VII. Newspaper articles concerning computers will be collected and summarized in a word processed report. A minimum of 15 articles need to be collected.
- VIII. Each student will enter and execute a simple BASIC program and describe program operation.
- IX. Students will observe computer ethics - **Plagiarism** will result in redoing assignments.
- X. The following must be included in the notebook:
 1. Cover sheet with name.
 2. Personal letter to a relative, friend, or public servant, or a report describing an event.
 3. Brag sheet or autobiography with scanned photograph of themselves.
 4. Resume?
 5. List of names and addresses of friends using the database management program. At least three entries must be included.
 6. A mail merged letter to each of the data based entries.

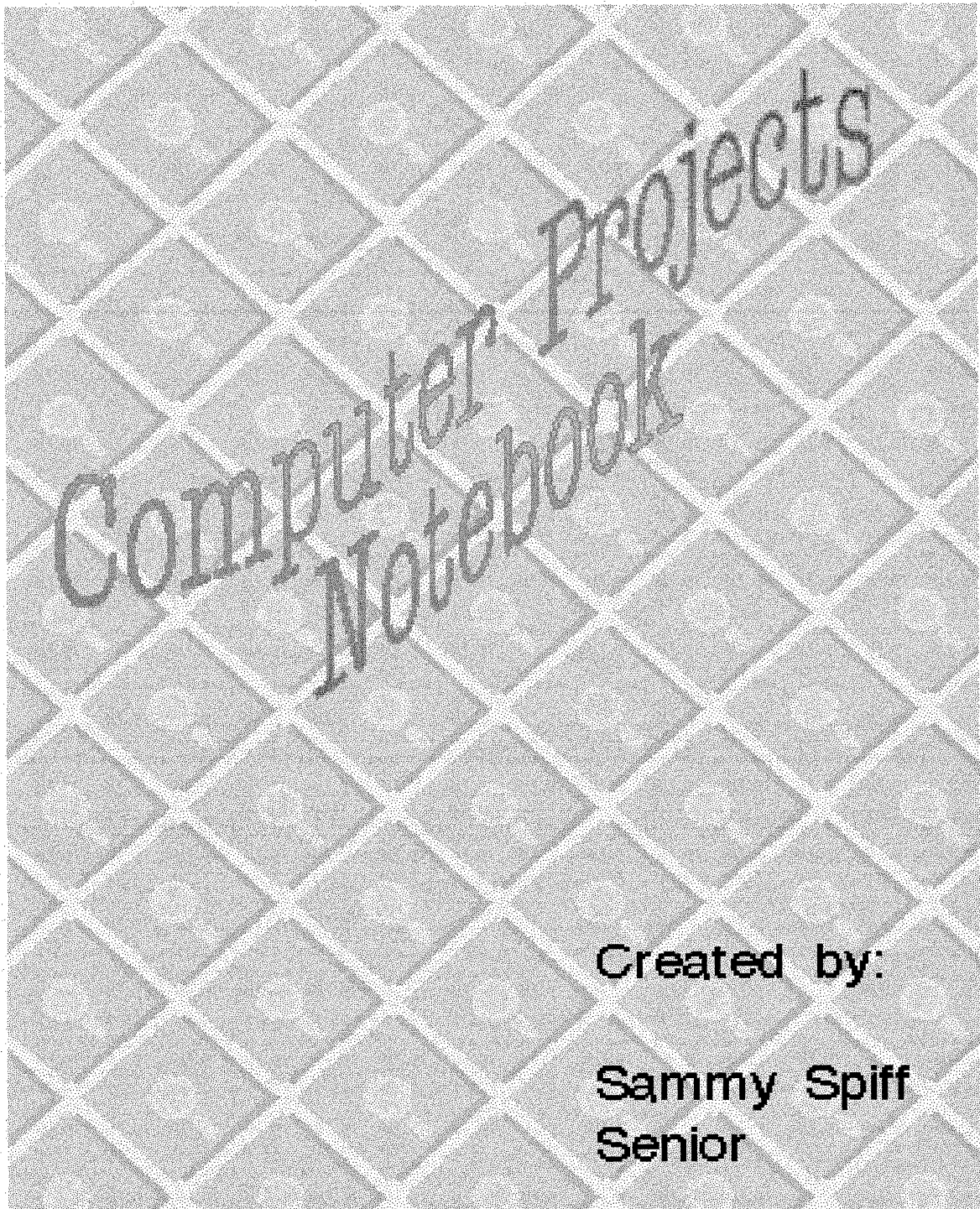
7. A budget created using the spreadsheet program. The budget includes income and expenses for an entire year.
8. Flyer indicating an upcoming event using Printshop Deluxe.
9. A recreated advertisement for a product or company.
10. Graduation announcements created with printshop deluxe.
11. A word processed report developed from the multimedia research.
12. A copy of the Internet and World Wide Web research (when available).
13. Printout of the BASIC program with description of operation.
14. Completed list of terms.

XI. It is expected that all students will use proper grammar and spelling. Reports will be handed back for revising as needed.

APPENDIX B

Sample Projects

(Sample cover page)



(Sample event report)

A Trip to the Grand Canyon

My family and I recently went on a trip to the Grand Canyon. Our trip included the Grand Canyon Caverns, a train ride from Williams, Arizona to the Grand Canyon, and rafting in Glen Canyon, the entrance to the Grand Canyon. We ended the trip by watching fireworks over the Colorado River in Laughlin, Nevada.

The Grand Canyon Caverns, which is located on route 66 about an hour before Williams, is hundreds of feet below ground. These are dry caverns because there is no moisture at all. There is a preserved bobcat that got trapped centuries before that dried up, but no deterioration because of no water and no bacteria. There is also a sloth, which looks like a huge bear, but lived tens of thousands of years ago. There are claw marks on the wall that shows how the sloth tried to climb out, but could not. The government planned on using these caverns as bomb shelters during the cold war. In fact, there are numerous barrels of food and water stored in the caverns. The food and water has been there for over thirty years, so I don't know how good it would be today.

We stayed the night in Williams, Arizona. We got up the next morning and watched a wild west gunfight show while waiting for the train. The train was an old refurbished Pullman, which was comfortable. The host on the train gave us free cokes while we watched the scenery out of the window for about two hours. When we got to the Grand Canyon, we were taken by bus on a tour of the southern rim of the canyon. The scenery was spectacular. It was amazing looking over a ledge down hundreds of feet.

I was fascinated by the amount of coins that were thrown in. I just wanted to reach down and scoop up the money, but it was far out of reach and impossible to get to. The other side of the canyon looked just like a giant painting. We stopped at several lookouts, and each time we could see something different. We saw hikers and people riding burros into the canyon. The motor coach took us back to the train where we again had cokes during the ride back to Williams. However, there was a mock train robbery on the way.

On the way around the Grand Canyon, we stopped at Lake Powell and took a raft trip through Glen Canyon. This is a narrow canyon in which the Colorado River flows through and into the Grand Canyon. This rafting trip took approximately three hours and was on very calm water. The water is so calm at this point that a motor is required to get through the canyon in just a few hours. The walls are steep and there are plenty of turns. We stopped along the way to look at petroglyphs left behind from the Anasazi Indians. We exited this trip at the entrance to the Grand Canyon raft trips, which goes through white water and takes several days to go through.

Our last stop was to watch the Fourth of July fireworks over the Colorado river in Laughlin, Nevada. The fireworks started at 9:00 pm and lasted for 22 minutes. This was a terrific display of fireworks with lots of variety. This was not a cheap display by any means.

Overall, this was a good trip and lasted about a week. We had a great time and found other interesting things to do the next time we visit. We might take a hike into the Grand Canyon or raft through the canyon and brave the white water. Whatever we decide to do, we will be back.

(Sample brag sheet)

This is the brag sheet of Samuel E. Spiff. My friends call me Sammy.

- * Right now I am a senior at San Andreas High school here in Highland. I live in San Bernardino, which is where I grew up. I live with my Mom, Step-Dad, sister, and little brother. I will graduate in June of 1997 and then I want to go away to college.
- * I am a good student. My best subject is Computers, my worst subject is English. I like computers because I'm good at it. I understand programs and I like to make things using the computers at school. I helped with the yearbook and prom this year using WordPerfect, Microsoft Works and Printshop. It was cool! I even got a certificate from the teacher for my participation.
- * Outside of school, I work. I started at Carl's Junior as a food worker, but I didn't like always cleaning things after everybody so I found a new job at Burger King. It's better because I get to work out front and talk to people and stuff. It doesn't pay that great but it's pretty good for now.
- * I'm an average 17 year old. I help out at home with housework with my sister and brother. Both of my parents work, so I try to help. I want to go away to school so I can live away from my family for awhile. I'm not sure what I want to do in the future, but I want to make lots of money. I think computers will have to be a part of my job because you can make more money if you know computers and besides, I like to use them.

(Sample Resume)

Samuel E. Spiff

12345 N. Dundy St.
San Bernardino, Ca. 92405
(909) 555-1234

OBJECTIVE

I wish to obtain part time employment with your company. I would like to train in any position with a chance to advance to full time after my graduation from high school.

EMPLOYMENT

Cashier - order taker **1996**
BURGER KING RESTAURANT SAN BERNARDINO, CA.

Take orders, collect cash payed, serve customers.

Food worker **1995-96**
CARL'S JUNIOR RESTAURANT SAN BERNARDINO, CA.

Prepare food to be cooked and served, clean food area, dining area, and back room.

EDUCATION

High School Diploma **1996**
SAN ANDREAS HIGH SCHOOL HIGHLAND, CA.

Major: Study all high school required subjects to obtain diploma.

Activities: Served on student council, helped to run student store with cashier position. Served on yearbook committee.

SKILLS

- have used cash register
- have helped order products for student store
- have helped in selling advertising space for yearbook
- have helped with advance selling of yearbook.
- used variety of computer programs to help produce yearbook

(Sample database list)

Last Name: Campbell
First Name: Amy
Address: 12123 Adobe Rd.
City,ST,Zip: San Bernardino, CA 92405
Phone: (909) 473-5115

Last Name: Judson
First Name: Derrick
Address: 12124 Dundy St.
City,ST,Zip: San Bernardino, CA 92404
Phone: (909) 387-2123

Last Name: Parks
First Name: Dan
Address: 12125 Cheshire Ct.
City,ST,Zip: San Bernardino, CA 92405
Phone: (909) 887-1110

(Sample form letter)

Dear «First Name» «Last Name»,

It is my great pleasure to inform you, that you «First Name», may already be a winner in our \$1,000,000 GRAND PRIZE give away!!! That's right «First Name» «Last Name»!

Just by sending in the enclosed registration form along with your order for \$1,000.00 in magazine subscriptions, you may be entered into our drawing.

«First Name», hundreds of others will apply so don't sit quietly in your easy chair at

«Address», «City,ST,Zip». Pick up that form and fill it out TODAY!

Don't forget to include your NAME, ADDRESS, and PHONE so that we may verify our information.

Our records show this info to be:

«First Name» «Last Name»
«Address»
«City,ST,Zip»
«Phone»

If this is a match, respond today! Remember, «First Name» «Last Name» MAY JUST BE
A WINNER!!!

(Do not pass go- Do not collect \$200.00 - This is a fictitious notification!)

(Sample merge letter)

(use sample data base list and form letter)

Dear Amy Campbell,

It is my great pleasure to inform you, that you Amy, may already be a winner in our \$1,000,000 GRAND PRIZE give away!!! That's right Amy Campbell! Just by sending in the enclosed registration form along with your order for \$1,000.00 in magazine subscriptions, you may be entered into our drawing.

Amy, hundreds of others will apply so don't sit quietly in your easy chair at 12123 Adobe Rd, San Bernardino, CA 92405. Pick up that form and fill it out TODAY!

Don't forget to include your NAME, ADDRESS, and PHONE so that we may verify our information.

Our records show this info to be:

Amy Campbell
12123 Adobe Rd
San Bernardino, CA 92405
(909) 473-5115

If this is a match, respond today! Remember, Amy Campbell MAY JUST BE A WINNER!!!

(Do not pass go- Do not collect \$200.00 - This is a fictitious notification!)

(Sample merge letter)

Dear Derrick Judson,

It is my great pleasure to inform you, that you Derrick, may already be a winner in our \$1,000,000 GRAND PRIZE give away!!! That's right Derrick Judson! Just by sending in the enclosed registration form along with your order for \$1,000.00 in magazine subscriptions, you may be entered into our drawing.

Derrick, hundreds of others will apply so don't sit quietly in your easy chair at 12124 Dundy St., San Bernardino, CA 92404. Pick up that form and fill it out TODAY!

Don't forget to include your NAME, ADDRESS, and PHONE so that we may verify our information.

Our records show this info to be:

Derrick Judson
12124 Dundy St.
San Bernardino, CA 92404
(909)387-2123

If this is a match, respond today! Remember, Derrick Judson MAY JUST BE A WINNER!!!

(Do not pass go- Do not collect \$200.00 - This is a fictitious notification!)

(Sample merge letter)

Dear Dan Parks,

It is my great pleasure to inform you, that you Dan, may already be a winner in our \$1,000,000 GRAND PRIZE give away!!! That's right Dan Parks! Just by sending in the enclosed registration form along with your order for \$1,000.00 in magazine subscriptions, you may be entered into our drawing.

Dan, hundreds of others will apply so don't sit quietly in your easy chair at 12125 Cheshire Ct., San Bernardino, CA 92405. Pick up that form and fill it out TODAY!

Don't forget to include your NAME, ADDRESS, and PHONE so that we may verify our information.

Our records show this info to be:

Dan Parks
12125 Cheshire Ct.
San Bernardino, CA 92405
(909) 887-1110

If this is a match, respond today! Remember, Dan Parks MAY JUST BE A WINNER!!!

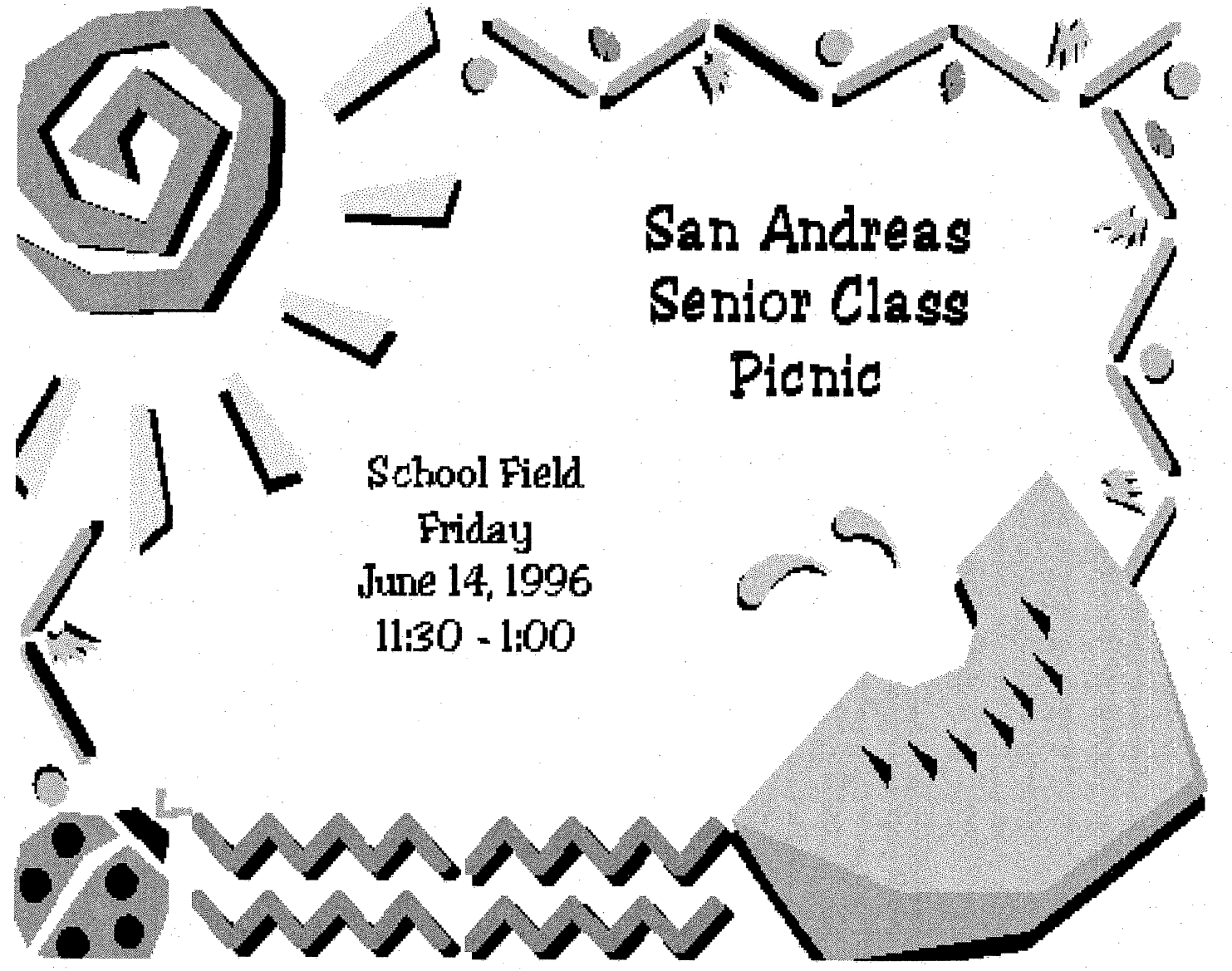
(Do not pass go- Do not collect \$200.00 - This is a fictitious notification!)

(Sample income and expense report)

	January	February	March	April	May	June	July
Income							
Sammy	2000	2000	2000	2000	2000	2000	2100
Sammette	1500	1500	1500	1500	1500	1500	1500
Total	3500	3500	3500	3500	3500	3500	3600
Expenses							
Rent	595	595	595	595	595	595	595
Car	225	225	225	225	225	225	225
Electric	45	49	41	44	59	65	85
Gas	56	68	48	29	21	18	17
Phone	78	55	35	32	48	56	47
Insurance	200	200	200	200	200	200	200
Food	400	400	400	450	550	600	675
Credit cds	500	500	500	500	500	500	500
Entertain	250	250	250	250	250	250	250
Misc	750	750	750	750	750	750	750
Total	3099	3092	3044	3075	3198	3259	3344
Savings	401	408	456	425	302	241	256

(Sample income and expense report)

	August	September	October	November	December	Total	
Income							
Sammy	2100	2100	2100	2100	2100	24600	
Sammette	1500	1500	1500	1500	1500	18000	
Total	3600	3600	3600	3600	3600	42600	
Expenses							
Rent	595	595	595	595	595	7140	
Car	225	225	225	225	225	2700	
Electric	101	105	78	55	51	778	
Gas	17	18	19	25	32	368	
Phone	38	44	40	52	69	594	
Insurance	200	200	200	200	200	2400	
Food	470	400	425	575	750	6095	
Credit cds	500	500	500	500	500	6000	
Entertain	250	250	250	250	250	3000	
Misc	750	750	750	750	750	9000	
Total	3146	3087	3082	3227	3422	38075	
Savings	454	513	518	373	178	4525	

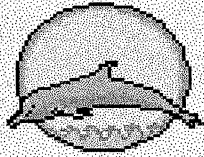


San Andreas Senior Class Picnic

School Field
Friday
June 14, 1996
11:30 - 1:00

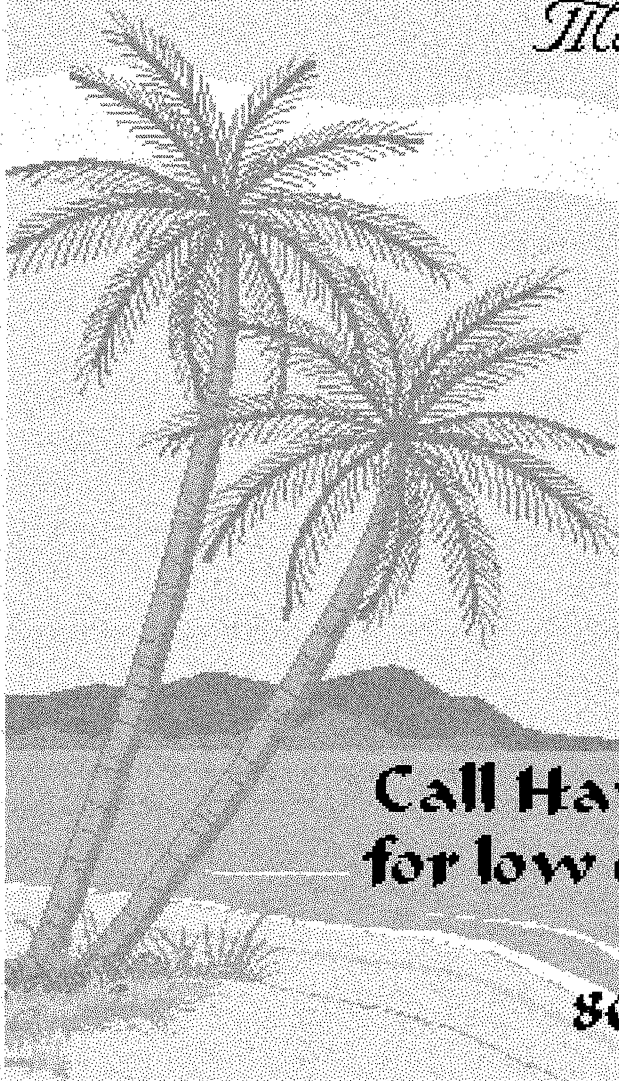
(Sample event flyer)

(Sample advertisement)



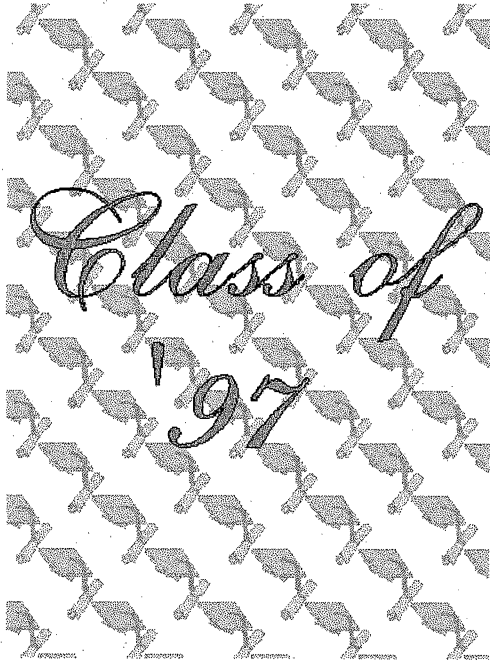
Hawaiian Holidays

*Make your dreams
come true!*



**Call Hawaiian Holidays
for low cost Vacations in
Hawaii
800-555-1212**

(Sample graduation announcement)



(Front)

*Invites you to witness
the graduation of
Samuel E. Spiff
from
San Andreas High
School
Highland, Ca.
June 10, 1997*

(Inside)



(Back)

A Failure of Gravity! How Would You Be Affected?

Scientists have known for years about the periodic changes in the polarity of the Earth's magnetic field. But what about it's Gravitational field? Could that change too?

Could the force of gravity become Repulsive?

What would happen to you? Would you fly off the face of the Earth? Develop an unsightly rash? Meet Elvis face to face? Who knows? What would happen to your family and loved ones? How would your spouse pay the mortgage? You need the **Special Protection** that only this new insurance can provide.

Now, for a nominal price, you can protect yourself and your loved ones from losses due to the failure of the Earth's gravity. **North American Gravity Insurance Co.** is the largest and oldest insurance company in its field. For a limited time, you can buy insurance for only \$10.00 that

Pays you \$1,000,000,000

(at the rate of \$1.00 per year) for injury or death due to the failure of gravity or the reversal of the Earth's gravitational field.

Double Indemnity: North American Gravity Insurance Co. will pay you twice the face amount of this policy (at the rate of \$2.00 per year) if you should die due to falling or being pushed into a Black Hole (Proof of loss will be required).

Don't let your family go without this important protection for another day. You pay only **one premium in your entire lifetime** for this insurance. When we receive your premium, we will send you a certificate, suitable for framing, to show your friends that you were smart enough to buy this important insurance. Remember,

No One Can Be Refused This Insurance For Any Reason.

Do not accept any cheap substitutes! NAGIC is the oldest and the best. We have never refused a claim. Send a check or money order (Sorry, no charge cards or COD's) today to

North American Gravity Insurance Co.
PO Box 14482
Huntsville, AL 35815

[home page](#)

Andrew S. Milman, amilman@primenet.com. Last modified 7/14/96.
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(Sample BASIC program)

```
0 REM (these REM lines need not be entered for program to work)
1 REM this program will calculate miles per gallon and keep a running total for an
2 REM entire month. Enter nothing for next mileage and total mileage for month
3 REM will be displayed, and total variables will be cleared.
4 REM a = dollar amount g = Gallons
5 REM im = beginning odometer reading m = mileage nm = ending odometer reading
6 REM mp = miles per gallon
7 REM td = total dollar amount tg = total gallons tm = total mileage
8 REM tmp = total miles per gallon for month
10 tm = 0: tg = 0: td = 0
20 PRINT TAB(30); "MPG Calculations"
30 PRINT : PRINT
40 INPUT "Enter Initial Mileage"; im
50 INPUT "Enter Next Mileage"; nm
60 IF nm = 0 THEN 140
70 INPUT "Enter Gallons"; g
80 INPUT "Amount $"; a
90 m = nm - im: tm = tm + m: tg = tg + g: td = td + a
100 mp = m / g
110 PRINT "MPG="; mp
120 im = nm
130 GOTO 50
140 IF tg <> 0 THEN tmp = tm / tg ELSE END
150 PRINT "total miles="; tm; " total gallons="; tg; " Total $="; td; " Month MPG=";
tm
160 tm = 0: tg = 0: td = 0
170 GOTO 50
```

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